

REMARKS

Claims 10, 17, and 20-26 remain pending. Claims 1-9, 11-16, 18, and 19 have been cancelled. Claims 10, 17, 21, and 26 are amended; support for the amendment may be found in paragraphs [0005] (motor drives compressor), [0011] (regenerative braking of compressor motor produces charging current), [0020] (“rapid” transient threshold rate of 40%/s), [0023] (charging current charges supplementary power source).

Rejections Under 35 U.S.C. § 112, Second Paragraph

Claim 10 stands rejected as allegedly indefinite for using the term “rapid transient mode.” Applicants respectfully traverse the rejection as it applies to the amended claims.

A “rapid transient mode” has been defined as a change at or above a threshold rate of 40%/s, as described in the specification at paragraphs [0019]-[0020].

Applicants respectfully request reconsideration of the claims as amended.

Rejection Under 35 U.S.C. § 102(e) over Arnold et al.

Claims 1-5 and 8 were rejected as anticipated by Arnold et al. These claims have been cancelled, making the rejection moot.

Rejection Under 35 U.S.C. § 103(a) over Arnold et al. in view of Lahiff

Claims 9 and 21-26 were rejected under 35 U.S.C. § 103(a) as unpatentable over Arnold et al., U.S. Patent 6,647,724, in view of Lahiff, U.S. Patent Application Publication 2003/0068538. Claim 9 has been cancelled. Applicants respectfully traverse the rejection and request reconsideration of claims 21-26 as amended.

The Arnold patent describes using an exhaust-driven turbine to generate electricity that powers a compressor. The compressor provides more oxidant to a vehicle engine for a power boost. The Arnold method does not supply oxidant to a fuel cell; nor does it supply oxidant in both a first capacity and a second capacity of a rapid transient mode. Instead, the Arnold compressor is operated intermittently to provide bursts of power, e.g. for ten seconds. This is described in the paragraph bridging columns 5 and 6, which the Office Action relied upon to show rapid transient mode. In the Arnold method described here, the compressor either operating or not operating, instead of operating at two different capacities as in Applicants' method. Finally, the Arnold method uses exhaust gas to power a turbine to turn an electric generator for the compressor.

The Lahiff publication describes a compressor that provides oxidant to a fuel cell. There is no reason, however, to modify the Arnold patent with this feature, however, as the Arnold objective of turbocharging an engine will not be served by providing the compressed air instead to a fuel cell system.

The Lahiff publication describes regenerative braking of a vehicle motor (motor 34 “operable both to drive the wheels of the vehicle and to be driven by the wheels so as to generate electricity during regenerative braking”), but nowhere does the Lahiff publication describe regenerative braking of the compressor motor. Nor does the Lahiff publication describe or

suggest using current from regenerative braking to charge a supplemental power source used to power the compressor during an upward rapid transient mode, thus recovering a portion of the energy expended by that supplemental power source itself via the regenerative braking.

For these reasons, reconsideration and allowance of the claims are thus respectfully requested.

Rejection Under 35 U.S.C. § 103(a) over Lahiff in View of Arnold et al.

Claims 10-14 and 17-20 were rejected as unpatentable over Lahiff in view of Arnold et al. Applicants respectfully traverse the rejection as it applies to the amended claims 1 and 10 and request reconsideration of the claims.

Beginning with the Lahiff publication, the Lahiff method describes regenerative braking of a vehicle motor (motor 34 “operable both to drive the wheels of the vehicle and to be driven by the wheels so as to generate electricity during regenerative braking”), but does not describe or suggest regenerative braking of a compressor motor. Nor does the Lahiff publication describe using the current from its regenerative braking to recharge a supplemental power source for its compressor. Instead, it appears that the current charges battery 106 of Fig. 9. See paragraph [0033] where it continues at the top of page 3 and paragraph [0045] on page 4. In contrast, in Applicant’s system, the same supplemental power source that powers the compressor motor during an upward rapid transient mode is recharged by compressor motor regenerative braking during downward rapid transient mode. The Lahiff publication instead teaches consuming excess braking energy by increasing power to the compressor, wasting the energy by venting the excess air pressure instead of using it in the fuel stack. Nothing in this Lahiff scheme of

regenerative braking conserves energy expended by a supplemental power source used to meet a sudden increase in power demand from a fuel cell system. The Lahiff patent does not even suggest a supplemental power source that is used during upward rapid transient mode.

The Arnold reference does not concern a fuel cell system that operates continually during vehicle operation. Instead, the Arnold reference concerns a compressor for turbocharging an internal combustion engine intermittently. The Arnold reference does not teach a compressor that is used in a normal mode with intermittent rapid transient upward and downward modes, but instead teaches a compressor used intermittently. Top of column 6. Such an operation would be of no use in a fuel cell system such as that of Lahiff. Therefore, there would be no reason to combine the Arnold compressor into the Lahiff system. Even with the combination, however, the references still do not suggest the features of regenerative braking of a compressor motor, using current from regenerative braking to recharge a supplemental power source that was used to power the compressor in an upward rapid transient mode, or the claimed threshold rate of 40%/s for a rapid upward transient mode.

For these reasons, reconsideration and allowance of the claims are thus respectfully requested.

Conclusion

It is believed that all of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicant therefore respectfully requests that the Examiner reconsider and withdraw all presently outstanding rejections. It is believed that a full and complete response has been made to the outstanding Office Action, and as such, the present application is in condition for allowance. Thus, prompt and favorable consideration of this amendment is respectfully requested. If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (248) 641-1600.

Respectfully submitted,



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